THE USE OF OPTICAL WAFER INSPECTION TO **QUALIFY EUV MASK DEFECTS AND PROCESS DEFECTS: LIMITATIONS AND ADVANTAGES OF THISTECHNIQUE**

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Programmed reticle defects

X:32nm X:32nm Y:24nm Y:20nm

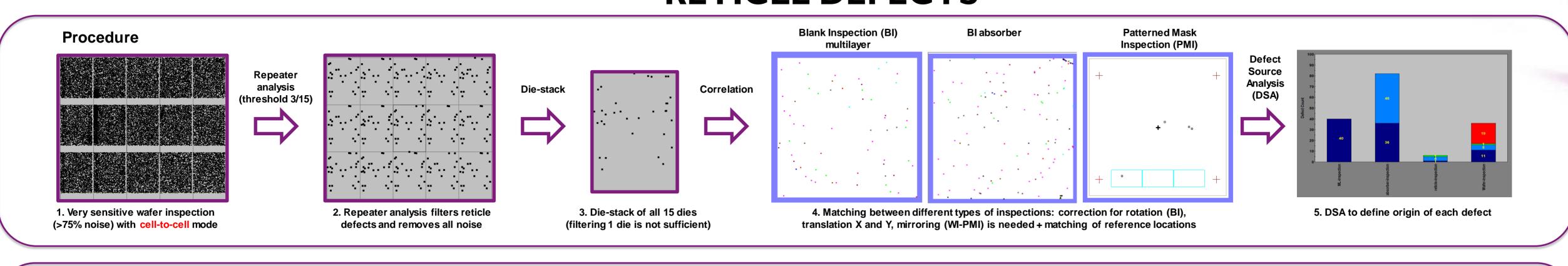
(purple bars indicate occasions of manual

handling of reticle)

X:32nm

X:28nm X:24nm

RETICLE DEFECTS



Protrusions is most challenging

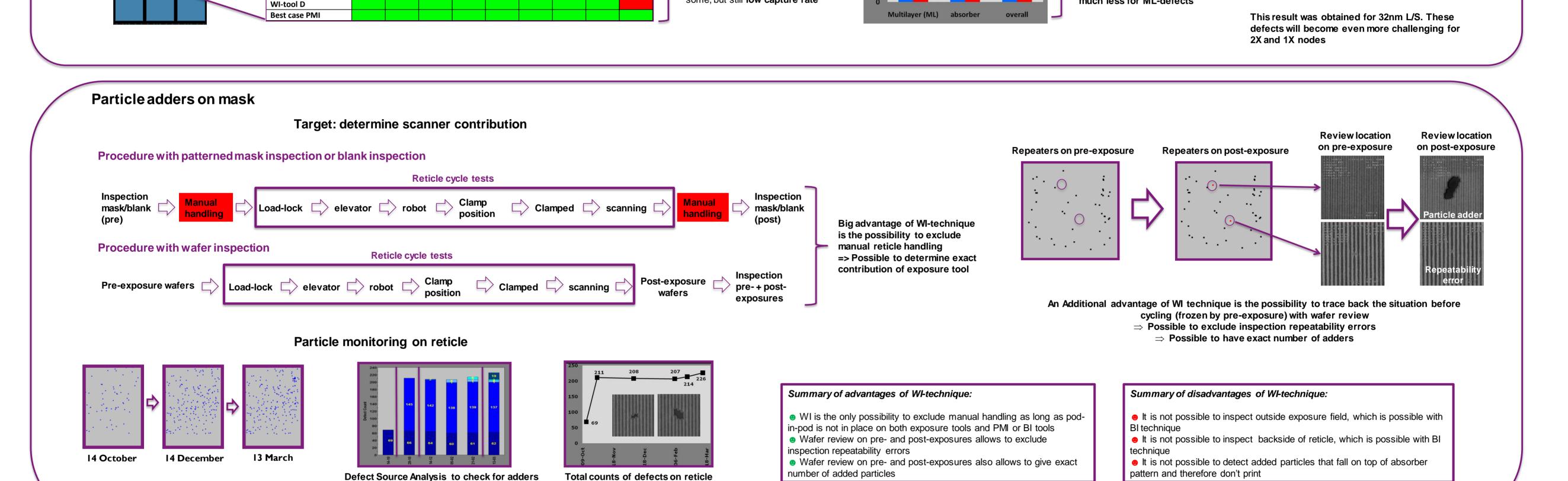
Standard WI is not capable of

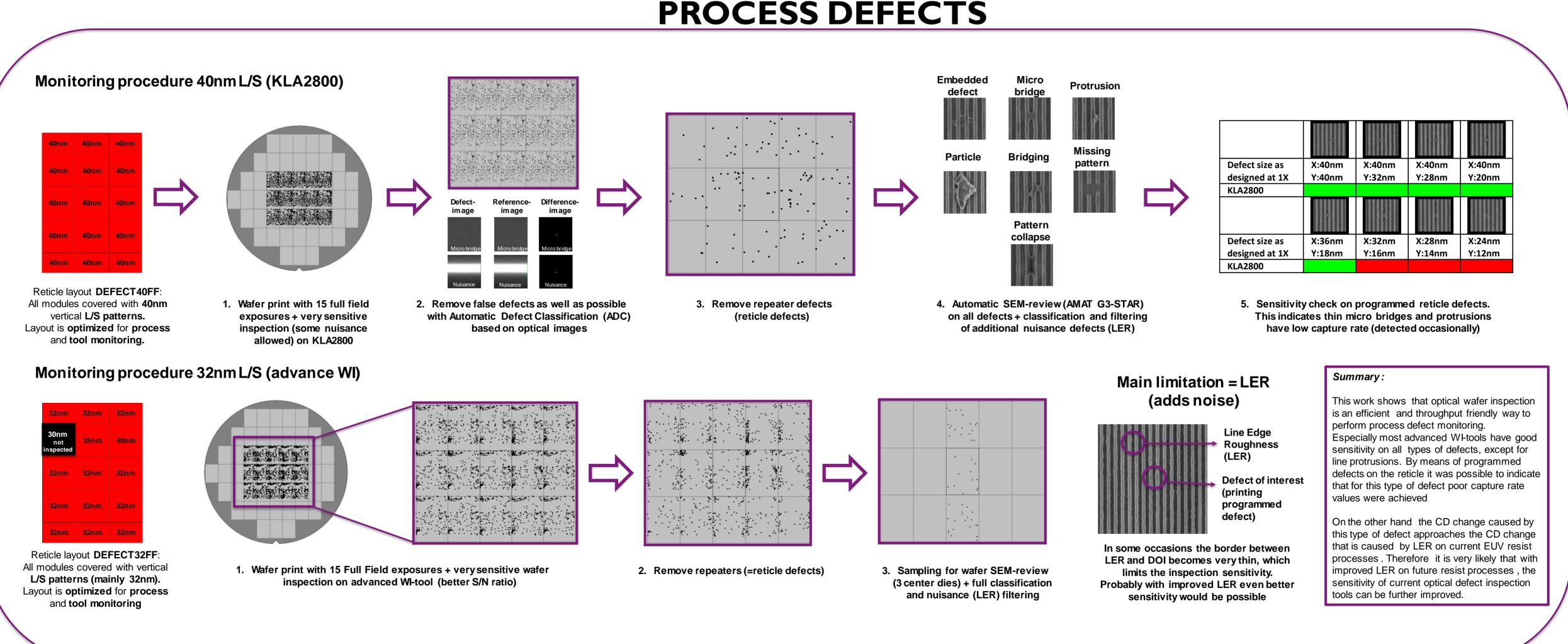
State-of-the-art WI-tools detect

some, but still low capture rate

type of defect for WI.

detecting these defects.











Sensitivity (32nm L/S)

(programmed defects in center)

WI-tool A

WI-tool B

WI-tool C















Natural reticle defects

WI has same sensitivity

for ML defects compared

to absorber defects, while

PMI has better sensitivity

for absorber defects, but

much less for ML-defects

Advantage of WI:

bast case WI best case PMI

Natural defects missed by WI

All known natural defects that were missed by

(Same conclusion as for programmed defects)

best case WI were smaller than micro bridge

(protrusions).





